MTA Capital Needs & Opportunities 1992-2011

Needs Opportunities

Metropolitan Transportation Authority

Summary

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The New York City region, more than any other section of the country, depends on public transportation.

Congested roads and fouled air today endanger the economic and physical health of the New York metropolitan area, threatening its future as a worldwide leader in finance and industry.

Evidence of the problem is everywhere: vital streets and highways clogged beyond capacity for six to eight "crush" hours a day, productivity losses due to workers caught in traffic, higher costs caused by delays in getting goods to market, bridges partially or totally closed because of deficient maintenance, and air quality far below even the minimum federal standards for breathability. In short, substantial portions of New York's transportation infrastructure are no longer adequate to sustain economic growth and are contributing to some of the worst air pollution in the country.

This situation did not develop overnight; it is the product of decades of auto-oriented land use and planning decisions, inadequate investment in public transportation, and a lack of funds for new capacity.

The roots can be traced to the 1940s and 1950s, when New Yorkers – like all Americans – fell in love with the automobile, engendering government policies and programs at all levels that accommodated the new mobility. Within a few years hundreds of miles of highways were built, bringing with them congestion and degraded air.

As automobile ownership soared and the region decentralized, the use of public transportation plummeted. On the subway alone, total ridership fell

from more than 2 billion in 1948 to under a billion in 1977. And with the drop in riders came a decline in resources devoted to maintaining, improving, and expanding those systems.

By the beginning of the 1980s the city's subways and buses had been neglected so long they were nearing collapse. Subway fires and derailments were commonplace, and cars were breaking down after barely 7,000 miles of service. Buses were filthy and unsafe. The commuter railroads were consistently late, had severe equipment problems, and carried large numbers of standees because of inadequate capacity.

Consequently, major portions of the largest transit network in the country, the Metropolitan Transportation Authority, were in jeopardy of grinding to a halt. A 5,000-square-mile region, home to 13 million people, with 6 million daily riders who depended on MTA service, was on the verge of becoming immobilized.

In 1982, supported by state, local, and federal officials, the MTA embarked on one of the biggest public-works rebuilding efforts in American history – a multi-billion-dollar capital program to restore and reinvigorate its infrastructure.

After eight years, the results of the MTA Capital Program are readily apparent. More than three-quarters of the subway cars, 85 percent of the buses, and nearly all the commuter rail cars are new or overhauled. Approximately two-thirds of the track in the subway system has been ripped up and replaced. Subway cars ran an average of 30,000 miles between breakdowns in January 1990, four times better than in 1982. Ninety percent of the cars and buses are air-conditioned; all are graffiti-free. Numerous maintenance shops, storage yards, and depots have been newly built or rehabilitated.

Dramatically improved rail systems, along with a resurgent regional economy in mid-decade, brought people back to public transportation. Ridership on the subway rose 8.5 percent between 1982 and 1989; on Metro-North, the increase since 1984 has been almost 18.7 percent.

The benefits of the capital program have not been limited to MTA riders; the investments have also had an impact on the city's traffic congestion. During the first five years of the 1980s, vehicle entries into the Manhattan central business district increased about 5 percent a year. Between 1985 and 1988, although the economy grew significantly, vehicle entries flattened and, in 1986, even declined slightly.

But merely keeping automobile use relatively stable does not fulfill the purpose of the MTA Capital Program, which aims to keep the region moving by getting people out of cars and onto transit. Despite the improvements in public transportation, automobile ownership in the New York region rose 22 percent

between 1980 and 1988, in tandem with the robust economy and with the need to travel to jobs in areas not served by trains and buses.

Most recently, the cyclical economic decline that began in 1988 has cut the number of jobs in Manhattan's central business district, destination of most of the subway's daily customers. At the same time, the city's social problems, manifested in crime and homelessness, have made some travelers reluctant to use mass transit. Average weekday subway ridership in the first quarter of 1990 dipped 2.5 percent, although MTA analysts believe this fall-off would have been more acute if not for the massive capital improvements that now make the subway a satisfactory transportation option for 3.7 million daily customers.

The capital improvements to date are only the first step in the continuing effort to improve the transit network.

To hold the ridership gains made over the past eight years and forestall erosion, efforts to enhance the appeal of train and bus travel must be redoubled. Moreover, short-term ridership fluctuations must not deter the continuing, long-term effort to rebuild and improve the transit network in anticipation of this region's future mobility needs. The capital improvements to date are only the first step.

This capital-needs assessment is intended as a springboard for discussion. It forecasts requirements over the next 20 years, presented in the context of recent history, current conditions, and projections for the short run and long term. It outlines the investments needed to restore and maintain the basic elements of the operating systems, along with investments to extend the benefits of those systems to additional users and markets.

Among the major initiatives outlined are:

- The subway, bus, and commuter rail fleets and some critical components of the infrastructure that supports them will be in a state of good repair at year-end 1991, the conclusion of the current phase of the MTA Capital Program. However, much remains to be done to renew both the stations and the "unseen infrastructure" of the MTA's systems. As we look to further increments of the MTA capital program, **full restoration of the entire network to a state of good repair must remain the central goal.**

- Investments already made in restoring the network to a state of good repair must be protected by **a program of continuing scheduled maintenance and normal replacement of critical elements** as they age and wear out.

- **Barriers to ridership growth**, including overcrowding, capacity limitations, cumbersome fare collection, inadequate passenger communications, and antiquated stations **must be addressed and eliminated**.

New York has the means to vault ahead of virtually every other region in the country in moving people efficiently and economically.

Expansion of public transportation coverage must be a key strategy for improving the New York region's mobility and for helping to achieve air-quality and energy goals. This will be essential in persuading substantial numbers of automobile users to switch to public transit.

If the capital program succeeds in reducing automobile use and increasing regional mobility, among the benefits will be fewer pollutants in the air and a reduced rate of increase in the region's consumption of gasoline. In pursuit of this goal, several possible service expansions are discussed, including connecting the 63rd Street subway extension to Queens subway lines, construction of a second East Side Manhattan subway, extending service across the West Side of Manhattan and into New Jersey, a trans-Hudson crossing (either bridge or tunnel) for Metro-North trains into Rockland and Orange counties, rail links to LaGuardia and Kennedy airports, and a Long Island Rail Road connection to serve the East Side of Manhattan.

The needs and opportunities outlined here are formidable, and so are the resources required to address them. It will cost an average of $1.9 billion a year to attain a state of good repair, sustain it with normal replacements over the next two decades, and improve the existing services that make up the MTA network. An additional $600-to-$800 million a year should be spent on projects to expand the network to meet market demands. If all the continuing needs plus the expansion projects were to be undertaken, a total of $50-53 billion, or $2.7 billion a year on average, would have to be devoted over the next 20 years to our public transportation systems. (Note: unless otherwise indicated, all cost estimates of projected needs in this report are in 1988 dollars.)

These challenges reach beyond the boundaries of the five city boroughs and the seven outlying New York State counties in the MTA region; they even cross state lines.

Consequently, the funds to continue rebuilding and to expand public transportation will have to come from a broad range of partners – from government within New York State and from New Jersey and Connecticut; from the Port Authority of New York and New Jersey, New Jersey Transit, and the MTA; from the private sector; and from the federal government.

For all its needs, the New York area is fortunate. While other regions, captives to their automobile-oriented pasts, are increasingly hamstrung by congestion, pollution, and lost productivity, New York alone has the infrastructure in place to begin to solve these problems. While other metropolitan areas are just beginning to build modest subway and light-rail systems, New York has a 714-mile subway, 1,300 miles of commuter railroads, and over 2,700 miles of bus routes already in operation. New York has the means to vault ahead of virtually every other region in the country in moving people efficiently and economically.

Successfully putting this plan in place offers the New York region a realistic hope of entering the 21st century with a mobility network that can be a model for the nation, one that can measure up to our true competitors: Tokyo, London, Paris, Hong Kong, Seoul, and every other business center on the globe that has had the vision to establish and maintain world-class transportation in support of its economic life.

Mobility: A Crisis for the 1990s

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In this region, adding appreciably to the highway network is not a feasible option for addressing traffic congestion.

The Problem

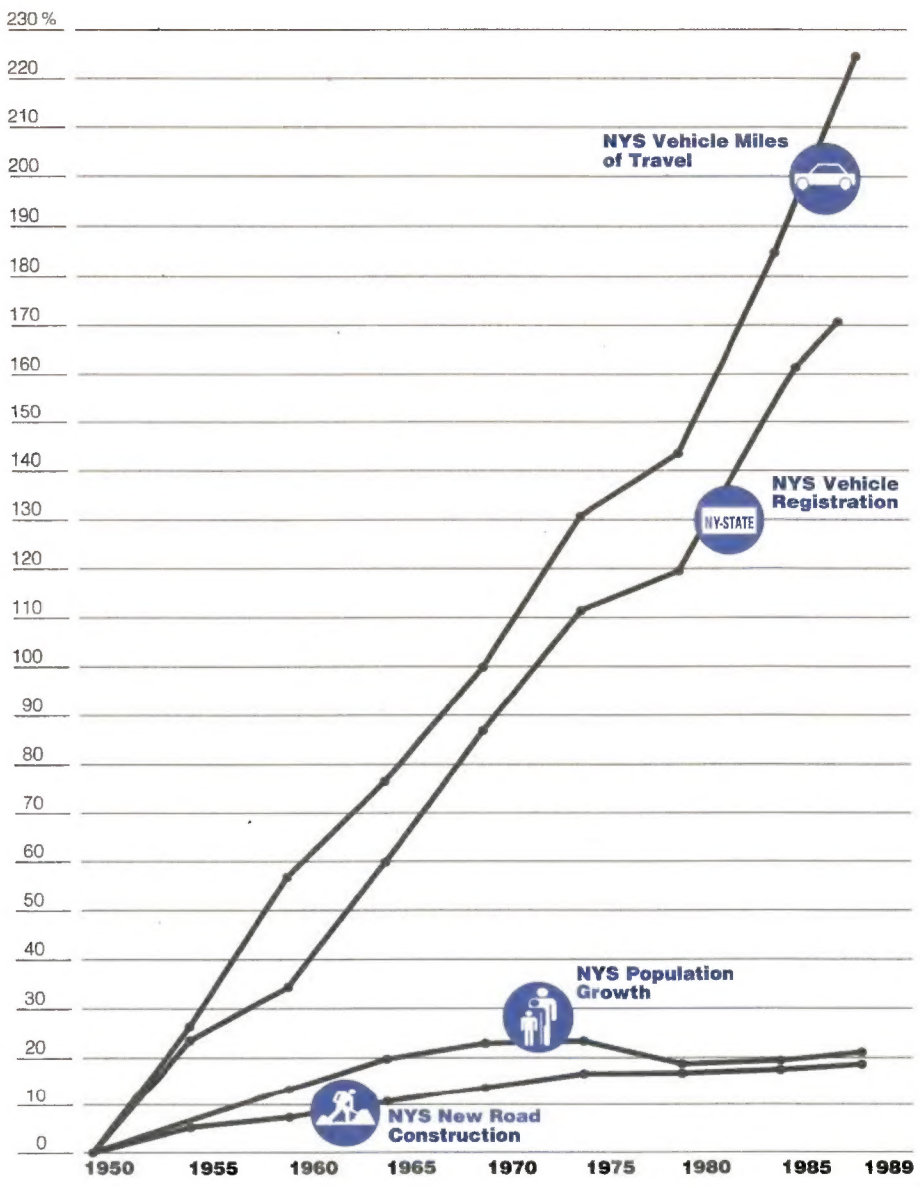
Almost from its inception, the automobile has been an icon of the American Dream. Whole communities that came of age after World War Two are creatures of the motor car. Reinforced by relentless advertising, the aura surrounding the automobile suggests comfort, privacy, and freedom.

But in the 1990s the dream is fading. Mounting traffic congestion and shrinking supplies of parking are making driving time-consuming and frustrating. Driving is also likely to grow more expensive as motorists are asked to bear a greater share of the cost of operating vehicles, maintaining highways and bridges, protecting the environment, and preserving energy resources.

Nationwide, the number of car registrations over the last 30 years has grown four times faster than the population. In New York State, over the same period, cars multiplied 15 times faster than human beings. Meanwhile, old roads have deteriorated and very little new capacity has been built. More and more cars are traveling on relatively fewer highway miles, making "gridlock" a watchword for our time.

Within the region, 9 million work trips occur each day and nearly 2 million of them are Manhattan-bound. Despite the recent growth in public transit ridership, the number of vehicles entering and leaving the 9.9-square-mile Manhattan central business district daily in 1986 was 21 percent greater than in 1976, with virtually no increase in the amount of street space for vehicles to circulate. This increased use of the automobile has led to traffic jams that cause an estimated loss of more than 350,000 work hours each day.

Why Traffic Congestion Has Worsened, 1950-1989



Automobile travel cannot continue to grow at the present rate without disabling the region.

A recent study of the Brooklyn-Queens Expressway placed the cost of congestion to truckers there at $34 million annually – for just one 12-mile-long highway. A major shipping service estimates New York's trucking expenses to be 30 percent above the national average.

Of the remaining 7 million daily work trips, most are inter-suburb, avoiding the central business district altogether. However, commuting conditions are equally trying in the suburbs. The rapid pace of dispersed, low-density suburban development has resulted in an almost total dependence on the automobile to meet travel needs. Many suburban roadways such as Route 110 in Suffolk County, the Long Island Expressway in Nassau County, Interstate 287 in Westchester County, I-95 in Connecticut, and Route 3 in

New Jersey are in a state of near-gridlock for several hours every day. These "expressways" have in fact become local roads without traffic lights. And conditions only promise to get worse.

According to current projections, regional roads that in 1987 carried 11.2 million vehicles daily will have to support 16.7 million vehicles by 2015 with little or no added capacity. A similarly ominous estimate has suggested that by the year 2000 "rush hour" congestion on Long Island could reach 15 hours a day of stop-and-go traffic.

Obviously, the region cannot handle such increases in vehicle miles without similarly drastic decreases in the quality of life and the efficiency of doing business. Adding appreciably to the highway network is not feasible; there is neither available land nor the political consensus needed to expand highway capacity on a massive scale. Consequently, ways must be found to increase regional mobility without increasing automobile use.

Air pollution is a further serious concern for the region. The New York-northern New Jersey corridor has some of the worst air quality in the country. Despite improvements in traffic management and tailpipe control measures, New York City has been unable to meet federal air-quality standards for ozone and carbon monoxide, both health hazards, for the last 20 years. Motor vehicles constitute the single greatest reason New York City is out of compliance. Some 70 percent of carbon monoxide pollution, about 50 percent of hydrocarbon pollution, and 45 percent of nitrogen-oxide pollution (hydrocarbon and nitrogen oxide are ozone precursors) come from cars and trucks. Although new fuels and changes in engine technology are reducing emissions, if current trends continue these advances will certainly be offset by increases in automobile travel.

Finally, consumption of petroleum imports remains an important issue for the nation and for our region. Consumers in New York State are more reliant on imported oil than is the nation as a whole. And with statewide demand expected to rise nearly 1 percent annually, foreign oil could account for as much as 84 percent of the state's total petroleum requirements by the year 2008.

The Solution

Mobility is essential to the economic growth and competitiveness of any region. With adequate transportation, people can get to jobs, consumers have access to services, and businesses bring goods to the marketplace on time

and at competitive prices. In addition to fostering a healthy economic climate, regional mobility serves other primary societal goals, such as protecting the environment and conserving petroleum.

In this context, a strong regional transportation policy for New York in the 1990s must begin with a much more aggressive effort to reduce dependence on the automobile as the primary means of travel. Moreover, innovative alternatives to the single-occupant automobile, such as car pools, van pools, and other forms of shared-ride, high-occupancy systems, must be recognized as part of the optimal transit mix, especially in markets outside Manhattan.

Transit Can Compete

Public transportation can compete more effectively with the automobile. In becoming more convenient, reliable, and comfortable while remaining reasonably priced, transit can expand market share, especially as localities move to impose greater restrictions on automobiles in order to reduce traffic congestion and air pollution. Moreover, as gasoline taxes, registration fees, tolls, and other levies on auto use mount, the cost of driving will escalate relative to transit.

In presenting this agenda of capital needs, the MTA recognizes that accomplishing the goal of increased ridership will require both a broader vision of how public transportation of the future should function and intelligent strategies for making transit an appealing option for people. Toward this end, future investment in public transit must support and be supported by:

- **Continued rebuilding and regularly scheduled maintenance of the existing network.**
- **Elimination of barriers to use.**
- **Integration of transportation services.**
- **Expansion of service to reach unserved and underserved markets.**
- **Attention to the total door-to-door travel needs of customers.**
- **Application of advanced but proven technology.**
- **Government policies that promote transit use rather than subsidizing autos.**

Rebuilding and Maintaining the Network

A transit network that comprises 2,000 miles of track and keeps 6 million riders each workday out of automobiles is an asset worth far more than even the vast sums it would take to construct it today. Restoring and maintaining it

properly is the most fundamental requirement for meeting future transportation needs. Retreating from this commitment would break faith with the public and undermine the hard-won progress of the last decade.

Transit must function more as a unified network.

Eliminating Barriers to Use

Overcrowded trains, antiquated stations, and poor communications with customers are among the barriers that discourage people from using transit. These barriers can be eliminated through capital investment in track, signals, and rolling stock, together with modernized stations, clear signs, and greater use of other communications technology. In addition, fear of crime and anxiety about being accosted by panhandlers are potent deterrents to greater ridership. Transit must eliminate these barriers and offer a safe and clean environment.

Integrating Services

The New York area's rail systems, planned in the 19th century as separate and competing entities, are not well coordinated today. As a result, travel from one part of the region to another by transit is often inconvenient, requiring several transfers, long waiting times and multiple fares. Over the long term, transit must function more as a unified network.

Trains could run, for example, from the Hudson Valley counties through Penn Station to Long Island or between New Jersey and Long Island. It would require big changes in the way service is operated, but the benefit to the customer of a one-seat ride paid for by a single, reduced through-fare would be substantial.

Better physical connections between transit modes must also be developed. For example, cross-platform transfers from bus to rail would allow a rider to step off a bus and board a waiting train. Closely coordinated services would also make transit a more attractive alternative to the private car.

Regional travel information must be supplied so that Metro-North customers, for example, can figure out easily how to get to Long Island. Transit maps showing all regional services, and clear and frequently updated signs, should guide travelers. An "800" telephone number could provide complete information on routes, cost, transfers, travel time, and departure time of all segments. Passenger information computer terminals, located at major activity centers, could provide even more detailed information, including printouts with maps of desired routes.

Expanding to Serve More Markets

Even with full integration of our current regional systems, transit services will not exist everywhere they are needed. Major capital investments must be made in underserved corridors, particularly those faced with severe conges-

tion problems. A regional transit network must also support greatly improved reverse commutation and inter-suburban travel.

Meeting Door-to-Door Travel Needs

Since customers rate the quality of a trip by its weakest link, improving traditional transit systems alone will not be sufficient. Travel to and from main-line transit services must also be planned for in order to increase ridership. This means that public and private transit providers, local businesses, developers, and all appropriate government agencies must work together, looking at what is needed to accommodate customers' total door-to-door travel needs. Undoubtedly this will include a broad mix of new, shared-ride services, special traffic lanes for high-occupancy vehicles, and new park-and-ride facilities.

Applying New Technology

Technology offers the opportunity for further improvements in reliability, productivity, and customer convenience. State-of-the-art fiber optic systems, currently being installed, will provide the path for improved communication throughout the transit network. New subway cars and bi-level commuter rail coaches with expanded seating capacity are being developed and tested. Computerized travel data systems will speed responses to information requests from customers. Modern, automated repair facilities will increase productivity and reduce operating costs: diagnostic equipment will help to pinpoint equipment failures, and interchangeable components will make repairs quicker and easier.

Automated fare cards for the subway and bus systems will make tokens obsolete and serve as the backbone of a regionally integrated fare structure. Customers could use a single card to pay for subways, buses, commuter rail, ferries, and vans, facilitating transfers among services. Discounts could be offered for trips involving multiple services or off-peak travel, keeping the price of the total trip competitive with the automobile.

In the course of the next two decades a central command center will, for the first time, allow the subway to be guided and tracked from one location. Electronic signs at station entrances will tell customers how service is running before they enter, and will direct them to alternative routes if necessary. Electronic signs on platforms will display the destination of the next train and the number of minutes until it arrives.

Other technological advances could provide increased capacity and quicker trips. Improvements in signaling technology may allow more trains to be run on crowded lines without the expense of building new tracks. High-speed rail and even maglev (magnetic levitation) should be explored as means of reducing travel time within the region and in the megalopolis along the eastern seaboard.

Changing Auto-Specific Policies

New transportation services alone, no matter how advanced, will not improve mobility for everyone. That is because travel patterns are heavily shaped by zoning and land use practices, tax policy, and pricing mechanisms, over which transportation providers have limited influence. These forces create economic incentives that ultimately determine where and how people live and travel.

To reduce traffic congestion, development must be concentrated so that employment sites can be served by public transportation. Federal tax policies should broaden the options and lower the cost of transportation financing open to state and local governments, and should ease the limitations on private participation in public-facility finance. One of the most visible inequities in the federal tax code is the provision that enables employers to provide free parking for employees – a tax-exempt benefit worth upwards of $400 a month – while limiting the tax-free benefit of employer-subsidized transit passes to $15. This must change.

Recent studies have shown that every commuter who uses transit instead of an automobile for one year prevents 63 pounds of carbon monoxide, 9 pounds of hydrocarbons and nitrogen oxides, and 1 pound of soot from entering the atmosphere. Similarly, the 1989 Draft Energy Plan states that the existence of public transit in New York State reduces fuel consumption by some 1.33 billion gallons annually. The study also notes that each 1 percent increase in transit ridership saves 7.5 million gallons of fuel per year – fuel that makes up our region excessively dependent on imports.

Beyond 2011: Future Possibilities

Transit that serves new markets and is more reliable, more accessible, and more hospitable will attract more customers.

Imagine walking to the corner, being carried by a bus or van to a station, walking a few steps across a protected platform as a train arrives, settling into a comfortable seat, traveling quietly at high speed, using a pre-coded plastic card to pay the fare, arriving in a suburb miles away, boarding a waiting bus or van, and reaching your place of business. All in less time than it would take to drive. And your employer is gladly paying one-half of your commuting costs as a necessary, reasonable, tax-deductible business expense.

A truly mobile, efficient, less-polluted region is possible.

Imagine traveling rapidly and conveniently by rail (avoiding traffic jams no matter what the time of day) to the terminal at the airport from which your flight is leaving. A few hours later you arrive at your business or vacation destination, pick up your luggage, and reflect that the first 20 miles of your trip were the most pleasant part of the journey.

Imagine entering a subway station, where an electronic sign tells you the next train is due in 90 seconds, where there are no lines at the fare booth, where customers pay with a plastic card, where security is enhanced by well-lit, closely monitored waiting areas, and where trains arrive frequently, are distinctly announced, and are pleasant to ride in, whether you sit or stand.

A transportation world that exists only in the imagination? Or a potential world that is waiting to be realized? Only time will tell.

What is not a fantasy is that New York's vast transportation network has, at best, stood still over the last half-century while the rest of the world's great cities have made quantum leaps in the speed, safety, comfort, convenience, and extent of their transportation systems. Paris, London, Hong Kong, Seoul, and other leading international centers are making huge investments in public transportation. Tokyo alone will add 300 miles of rail service in the next 10 years. England and France have opened entirely new lines, are building and planning more, and will link high-speed rail service under the English Channel by the end of the century.

The rest of the world is forging ahead in all forms of public transit, while New York in the last quarter century has added a grand total of five miles of new rail service. If today's subway and commuter lines had been constructed at that pace, they would not have been completed before the 25th century.

The measure of New York's success in resolving its mobility challenges will be economic growth. This region could enter the 21st century with the most efficient and balanced transportation network in this country. That would mean a more mobile society, a healthier environment, a more efficient work force, and an economy that is much more competitive in the world marketplace.

A truly mobile, efficient, productive, less-polluted region is possible. There is no secret about how to achieve it – it will take public support, financial commitment, and competent management, all working toward giving people credible options to driving.

Benefits of the 1982-1991 Capital Program

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Since 1982 the MTA has been engaged in the largest transportation rebuilding effort in United States history.

In the early 1980s, metropolitan New York's public transportation network was in peril. The neglected, graffiti-smeared subway was falling apart, and it was feared that a complete shutdown was imminent. Buses were breaking down after little more than 1,000 miles on the streets. Between 1969 and 1982, average weekday ridership on the subway had plummeted from 4.6 million to 3.4 million.

The commuter railroads were in deplorable condition. On the lines running north of the city, cars and coaches were dilapidated and dirty; track, switches, tunnels, power, and shops had been pushed far beyond their normal life spans and were failing daily; trains were overcrowded and seldom arrived on time. A report prepared in 1980 for the U.S. Railway Association predicted that unless locomotives and rolling stock were replaced and regular maintenance was begun immediately, the Hudson and Harlem lines could "approach total collapse." *The New York Times* warned that overcrowding, due in part to the number of rail cars out of service, could harm the region's economy.

On the Long Island Rail Road, chronic equipment shortages forced thousands of riders to stand every day. Air conditioning was virtually nonexistent, so conductors were issued wedges as standard equipment to prop open car doors for ventilation. Track, switches, third rail, and maintenance shops were overage, unable to bear the stress of carrying the nation's heaviest commuter rail traffic.

The New York State Legislature declared a "transportation emergency" in 1981, approving the first phase of the MTA Capital Program and mandating the restoration of the transit network. That mandate was clear: develop a plan and start in 1982 to rebuild and to improve service, forestall a repeat of the cycle of neglect by meeting the physical needs in the years to come, and position the network to meet the region's mobility requirements in the 21st century.

Since 1982 the MTA has been engaged in the largest transportation rebuilding effort ever undertaken in the United States, totaling $16.2 billion over a ten-year period. And it has been delivering on that investment. Capital improvements are bringing riders back to public transportation by returning the MTA network to a "state of good repair"– eliminating the crises that accompany obsolete, deteriorated equipment. For example, the subway, bus, and commuter rail fleets, as well as much of the physical plant that supports them, have been replaced or reconstructed.

More reliable rolling stock and better-equipped maintenance shops have raised performance levels and added service on many subway and commuter rail lines. The bus system is in better condition than it has been in decades. Customers have approved these capital expenditures in the most persuasive way they can: by taking more rides. Between 1982 and 1989, total combined annual ridership at the MTA's three major agencies rose from 1.62 billion to 1.69 billion, a gain of 4.3 percent.

Economic Impact of the MTA Capital Program in New York State

The MTA Capital Program has also been a direct stimulus to New York State's economy. Capital program work in the 1982-91 period is generating an average of 14,800 jobs within the state each year. The jobs are in engineering, construction trades, new car manufacturing and car rehabilitation, and in those industries that supply the materials and equipment for capital program projects. The $16.2 billion in contractual commitments for this ten-year phase of the program is projected to result in $19.5 billion in New York State economic activity, $6.6 billion in wages and salaries, and about $740 million in city and state taxes.

Following are descriptions of work accomplished and benefits achieved at MTA transit agencies after the first eight years of the capital program.

New York City Transit Authority

The New York City Transit Authority operates the largest public transportation system in the country: 6,100 subway cars and 3,800 buses carry 1.5 billion riders per year. More than 700 miles of subway, surface, and elevated track snake under and around the city.

Initially, the greatest emphasis in the TA's $12.2 billion capital program had to be placed on the safety of track and on the faltering subway and bus fleets. In 1983 riders experienced countless delays as trains inched along hundreds of "red tag" zones, sections of worn-out track where speeds were restricted to 10 m.p.h. to avoid derailments. That year there were passenger-train derailments on an average of every 18 days. Since then, the TA has rebuilt 431 miles of the track in the 714-mile system and has eliminated all the danger zones. Customers are getting smoother, swifter, safer rides: track fires have declined by 35 percent and derailments caused by faulty track dropped to three in 1989.

Some Achievements of the MTA Capital Program

New York City Transit Authority	1982	1989
Annual Subway Ridership (Millions of Riders)	989	1,073
New and Overhauled Subway Cars (Percent of Fleet)	0%	76%
Wheelchair-Equipped Buses (Percent of Fleet)	30%	76%
Air-Conditioned Subway Cars (Percent of Fleet)	48%	93%
Main-Line Track-Related Derailments (Annual Number of Incidents, 1983 & 1989)	12	3

Over $4 billion has been committed since 1982 to purchase subway cars and buses and to rebuild older ones. All 1,775 new cars ordered have been delivered and are in service, as are approximately 2,900 of the 4,168 cars to be overhauled by 1992. More than 2,450 new buses and 2,013 rehabilitated ones have been ordered or are already on the streets, with almost 700 more to be overhauled by the end of the current capital program phase.

As new and overhauled cars have gone into service, modest improvements in maintenance facilities, combined with prodigious efforts by TA employees, have enabled the authority to boost the reliability of the car fleet by 200 percent and of the bus fleet by more than 80 percent. Customers today enjoy a subway fleet that is 93 percent air-conditioned. The constant refrain of "This car out of service" has faded as cars ran over 22,000 miles between breakdowns in 1989, compared with 7,145 miles in 1982. Eighty-five percent of the

buses are air-conditioned; 76 percent are accessible to the mobility impaired, which prompted ADAPT, a national organization of the disabled, to commend the TA in 1989 for having one of America's most accessible bus fleets.

In addition to the investments in track and rolling stock, the TA has work in progress, and some projects completed, on virtually every component of the system, including shops and yards, bus depots, stations, and the "unseen subway" of tunnels, switches, power stations, pumps, fans, and communications systems that make travel safer and more reliable.

One especially visible capital program benefit had been awaited since the early 1970s by customers in Queens and Manhattan: the Archer Avenue and the 63rd Street subway extensions. These segments are fragments of a wholly new line that was to relieve congestion on the Queens Boulevard E and F lines, one of the most overcrowded services in the city. But the 63rd Street extension stops short in Long Island City, and additional funding is needed to connect it to the Queens Boulevard lines, a distance of about 1,700 feet.

The TA today provides 312.1 million car-miles of service annually, 16.2 percent more than in 1982. Between 1982 and 1989 yearly subway ridership grew 8.5 percent, from 989 million to 1.073 billion customers. These milestones would have been unthinkable without capital program investments.

Staten Island Rapid Transit Operating Authority

The Staten Island Rapid Transit Operating Authority (SIRTOA) operates a 29-mile railroad in Staten Island, New York City's fastest-growing borough. SIRTOA is under the aegis of the Transit Authority, which makes investments to meet the railroad's physical needs and to respond to Staten Island's development and ridership trends. By carrying customers directly to the Manhattan-bound ferry, SIRTOA provides an essential alternative to the automobile for Staten Island residents employed in the city's central business district. Ridership on the railroad has risen more than 9 percent, from 5.76 million in 1982 to 6.29 million in 1989.

Major SIRTOA capital projects initiated or completed since 1982 have been targeted at the need to serve an increasing number of customers, as longer trains have been added and track and stations restructured to accommodate them. Each of SIRTOA's 52 cars is undergoing a complete overhaul. An additional 12 overhauled cars currently assigned to the TA fleet will be transferred to SIRTOA in order to implement five-car trains by the end of the current capital program phase in 1991.

Metro-North Commuter Railroad

Fanning out from Grand Central Terminal, Metro-North's Harlem, Hudson, and New Haven services are lifelines between the central city and its northern suburbs. Carrying 57 million riders annually, 200,000 on the average workday, Metro-North is America's third largest commuter railroad. It extends through two boroughs in New York City, five suburban counties in New York State, and two in Connecticut. (The State of Connecticut is responsible for New Haven line capital costs in that state, with the exception of main-line rolling stock, the cost of which is shared.)

The railroad's physical plant consists of 744 miles of track, 118 passenger stations, dozens of power substations, bridges, tunnels, viaducts, parking facilities, shops, yards, offices, and employee facilities. It operates 816 rail cars and locomotives.

Some Achievements of the MTA Capital Program

Metro-North Commuter Railroad	1983	1989
Annual Ridership (Millions of Riders, 1984 & 1989)	47.8	57
Trains Arriving On-Time (Percent of Fleet)	80.5%	92.6%
Daily Standees (Number of Riders Standing)	4,100	105
Air-Conditioned Cars (Percent of Fleet)	86.0%	98.4%

Metro-North has been reconstructing itself virtually from the ground up since it became part of the MTA in 1983. As part of its $1.7 billion capital program, it has provided customers with 196 new electric cars, guaranteeing almost every rider a seat.

Electrification of the upper Harlem line boosted its on-time performance from 83.1 percent in 1983 to 92.1 percent in 1988. On the segment between Grand Central and Brewster, before the completion of electrification in January 1984 on-time performance was 59 percent. By December 1984, on-time performance was 96.6 percent. Travel time reductions include savings of from 7 to 21 minutes per trip (with an average of 16 minutes) from the outer stations. The number of late trains on the line declined more than 90 percent between 1985 and 1988. The additional ridership on the line resulted in an increase of $5.5 million in revenue each year from 1984 to 1988.

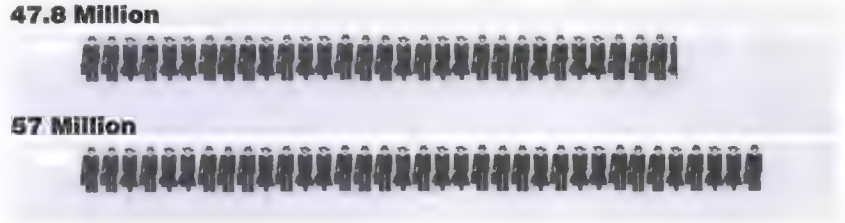
Capital program investments have built new car-maintenance shops and have rehabilitated some older ones. New power substations are supplying ample electricity for the expanded, air-conditioned fleet of longer trains and for

maintaining faster speeds and schedules. Because the older substations required continuous staffing, the new substations enabled staff reductions, resulting in annual savings of $2.6 million. New coaches and rebuilt locomotives are running faster over rehabilitated track on the upper Hudson line. The number of weekday trains going straight through to New York City, with no need for passengers to change trains, increased from 6 in 1983 to 26 in 1987, including the introduction of the first express service from Dutchess County. On weekends the number of through trains increased from 4 in 1983 to 19 in 1989. Ridership on this line has increased, resulting in a net increase in annual revenue of approximately $2.6 million.

The MTA Capital Program has provided dramatic increases in service for Metro-North customers. On-time performance for the entire railroad has risen steadily, from 80.5 percent in 1983 to 92.6 percent in 1989, the highest in Metro-North's history. Air-conditioning performance climbed from 86 percent in 1983 to 98.4 percent in 1989. The number of standees in the a.m.-peak period decreased from 4,100 in 1983 to 105 in 1989. Standees on the Hudson and Harlem lines in the a.m. peak (2,400 in 1983) are virtually nonexistent.

Metro-North Ridership Growth 1984–1989

All Metro-North Lines +19.2%



Fastest Growing Markets:

Upper Harlem and Upper Hudson Lines

Off-Peak Travel and Reverse Commutation

The railroad's bottom line, ridership, has surged a remarkable 19.2 percent since 1984, from 47.8 million passengers a year to 57 million. Ridership on the upper Hudson and upper Harlem segments has jumped as much as 50 percent. Non-commuter travel has increased by 36 percent, showing strong growth in the off-peak, more discretionary market.

Long Island Rail Road

Linking New York City, Nassau, and Suffolk counties, the LIRR extends 117 miles to the eastern tip of Long Island. The nation's most heavily traveled commuter railroad, and at 155 years of age, one of the oldest, the LIRR carries more than 75 million riders annually. Were the LIRR not serving the needs of 272,520 customers on more than 730 trains each weekday, round-the-clock gridlock would be a permanent feature of Long Island's already congested highways. The LIRR also runs a small freight operation that has the potential for diverting truck traffic from the area's roads.

The railroad's physical plant includes approximately 595 miles of track, 134 passenger stations, over 355 bridges and viaducts, shops, yards, parking facilities, and power, signal, and communications systems. Its fleet includes approximately 1,200 rail cars, coaches, and locomotives.

Not designed for the intensive use it receives today, the LIRR's layout is constricted at Jamaica and the East River tunnels and has insufficient platform space at Penn Station. The railroad's $2.1 billion in 1982-91 capital investments have been aimed at expanding capacity in order to handle more trains and customers and at replacing antiquated maintenance facilities so the fleet can run more reliably.

One hundred seventy-four new electric cars have provided thousands of additional seats, reducing the number of standees west of Jamaica during peak periods from about 15,000 in 1982 to 2,730 in 1989. The new cars allow for longer trains, with the busiest branches increasing from 10 cars to 12. They have raised the dependability of LIRR service, bringing the fleet's average miles traveled between breakdowns in 1989 to 26,260, compared with 16,168 miles in 1982.

Electrification of the Main Line to Ronkonkoma has reduced scheduled riding time for Manhattan-bound customers by up to 30 minutes. Travel to Penn Station and to the Flatbush Avenue terminal in Brooklyn is now direct, without

Some Achievements of the MTA Capital Program

Long Island Rail Road	1982	1989
Annual Ridership (Millions of Riders)	71.4	75.4
Daily Standees-A.M. & P.M. Peak (Riders Standing West of Jamaica)	15,000	2,730
Main Line Travel Time (Minutes from Ronkonkoma to Penn Station)	93	63
Service to Penn Station - A.M. Peak (Number of Trains, 1981 & 1988)	76	92

a change at Jamaica. Electrification has attracted thousands of additional commuters to the line, with a.m.-peak ridership climbing from 6,830 to 14,130. On the Port Jefferson branch, a second electrified track to Huntington saves customers from 5 to 16 minutes, and diesel express service between Huntington and Jamaica cuts as many as 5 minutes from the trip.

A new bridge over Reynolds Channel has replaced an old structure that often stuck and caused long delays for Long Beach branch customers. The new bridge has also contributed to faster service, the result of increases in speed that save up to 5 minutes in travel time.

The new John D. Caemmerer West Side Yard near Penn Station has created much-needed storage space where 320 cars can be serviced, have their interiors cleaned, and returned quickly to operation. Together with new cars, the yard has enabled the LIRR to increase a.m.-peak trains to Penn Station by 21 percent, from 76 to 92, and the number of cars by 28 percent, from 676 to 866. It allows more trains to be run in and out of Penn Station during peak periods by cutting the number of empty trains moving back to Long Island for storage. The opening of this yard has resulted in a net reduction in the number of maintenance employees needed, saving approximately $2.2 million annually.

Nearing completion is the largest project in the LIRR's capital program, the Hillside Maintenance Complex. It includes a new shop to maintain and rebuild the railroad's fleet of 934 electric cars, replacing an outmoded shop at Morris Park that dates to the turn of the century. There have been numerous problems in constructing Hillside, including substantial budget increases and schedule slippages, but the project is now under control. Once it comes on line, starting in late 1990, customers should find themselves riding in reliable, better-maintained cars that have a far lower potential for breakdowns.

Triborough Bridge and Tunnel Authority

The Triborough Bridge and Tunnel Authority not only plays a direct, essential role in the mobility of the region, it also contributes surplus revenues to mass transit from the tolls it collects, thus helping to reduce the volume of road traffic.

The TBTA is the largest bridge and tunnel toll-collection agency in the United States. In 1989, 276.6 million vehicle trips were made across its seven bridges and through its two tunnels, and more than $590 million in toll revenue was collected. Among its facilities are the longest suspension bridge in North America (the Verrazano-Narrows) and the longest underwater tunnel in the United States (the Brooklyn-Battery). During a typical traffic day, more than 750,000 vehicles carrying more than one million people use its 63 traffic lanes. Since 1968, when the TBTA became an agency of the MTA, there has been more than an eleven-fold increase in the revenue it produces to support mass transit.

Heretofore, the TBTA has been a contributor to the MTA Capital Program, not a recipient. Now, as it examines the state of its facilities and assesses their long-term stability, Triborough is preparing a capital plan of its own.

Where We Are

Eight years of systematic MTA Capital Program investments have rescued the region's disintegrating transportation infrastructure and have won approval from customers, who have begun a modest movement away from automobile travel. But the long-term physical soundness of the network is hardly assured, and the region's mobility needs in the decades ahead are far from met.

There remains a sizeable unfinished agenda of capital work to complete the restoration of the MTA network to a state of good repair, which remains the MTA's abiding concern. The more reliable, comfortable service that comes from investments in new and rebuilt plant and equipment must be protected by continual replacement and by additional investments that remove barriers to ridership growth. Crowding must be alleviated; access to MTA services must be easier to reach and to connect with; travel information must become widely available; public transportation's environment must be far more inviting; new services to new markets must be created. The mass transit alternative must be made increasingly attractive to the millions of potential customers who consider their automobiles the only practical form of travel. It has been recognized from the outset that many years will be required to accomplish these objectives.

Continuing Capital Needs: Protecting Investments and Breaking Down Barriers to Ridership Growth

4

Between the years1992 and 2011 the MTA must continue rebuilding the transportation network to compensate for decades of neglect; at the same time, rolling stock and physical plant components have to be replaced as they age and wear out. Moreover, improvements must be made to promote greater efficiency, safety, and reliability; to upgrade service; to attract more customers; to accommodate ridership growth; and to meet changing market requirements.

These needs will cost a total of $37.1 billion over 20 years, or an average of $1.9 billion annually. They fall roughly into three categories:

State of Good Repair

Projects that correct for previously deferred maintenance or replace aging equipment and facilities that are already beyond their useful lives.

Normal Replacement

Projects that maintain good repair by replacing components as they reach the ends of their useful lives.

System Improvements

Improvements that add track and train service to the existing configuration of the MTA network, reduce congestion by eliminating bottlenecks and other constraints, make service more reliable, pleasant, and comfortable, reduce travel time, and provide increased information for customers and employees.

Getting people out of their cars and on to public transportation is the MTA's primary challenge in the 1990s and beyond. Renewing the system alone wil not meet this challenge; enhancing it can go a long way toward attracting a keeping new customers.

Summary of Continuing Capital Needs by Agency 1992-2011 (1988 $)

	TA	M-N	LIRR	TBTA	Total*
State of Good Repair	$10.4 Billion	$1.0 Billion	$0.3 Billion	$0 Billion	$11.8 Billion
Normal Replacement	$12.3	$1.5	$4.2	$1.4	$19.4
System Improvements	$ 2.6	$1.4	$1.3	$0.6	$ 5.9
Total*	$25.4 Billion	$3.9 Billion	$5.7 Billion	$2.0 Billion	$37.1 Billion

*Numbers may not add up to total because of rounding.

New York City Transit Authority

State of good repair of all plant and equipment can be achieved and a cycle of normal replacement can be maintained during the next 20 years. It will take an investment of about $1 billion annually. However, if New York City is to retain its premier national and international economic position, rebuilding and maintaining the current transit system is not enough. An ambitious effort is required to increase mobility in the region by making the subway and bus systems attractive and preferred modes of travel for millions of drivers of single-occupancy vehicles.

Despite substantial improvements to date, the subway system still has many deficiencies: overcrowded lines, difficult transfers between certain lines, inconsistent service reliability, long waits at token booths, and run-down stations. The TA is proposing a number of projects over the next 20 years to address problems that discourage people from using the subway.

Continuing Capital Needs 1992-2011 (1988 $)

	New York City Transit Authority
State of Good Repair	$10.4 Billion
Normal Replacement	$12.3
System Improvements	$ 2.6
Total *	**$25.4 Billion**

*Numbers may not add up to total because of rounding.

State of Good Repair
Normal Replacement

Rolling Stock: Subway Cars and Buses

The investments in the current capital program will bring the subway cars and buses to a state of good repair by 1992. Emphasis will then shift to maintaining these fleets in good condition. Over the next 20 years, $5.2 billion will be needed to replace rolling stock on a regular cycle. Subway car replacements will begin in the late 1990s. Competing suppliers are now producing designs for prototype cars with technologies that should yield better performance and reliability, improved air conditioning, comfort, lighting, electronic information systems, and greater ease of maintenance.

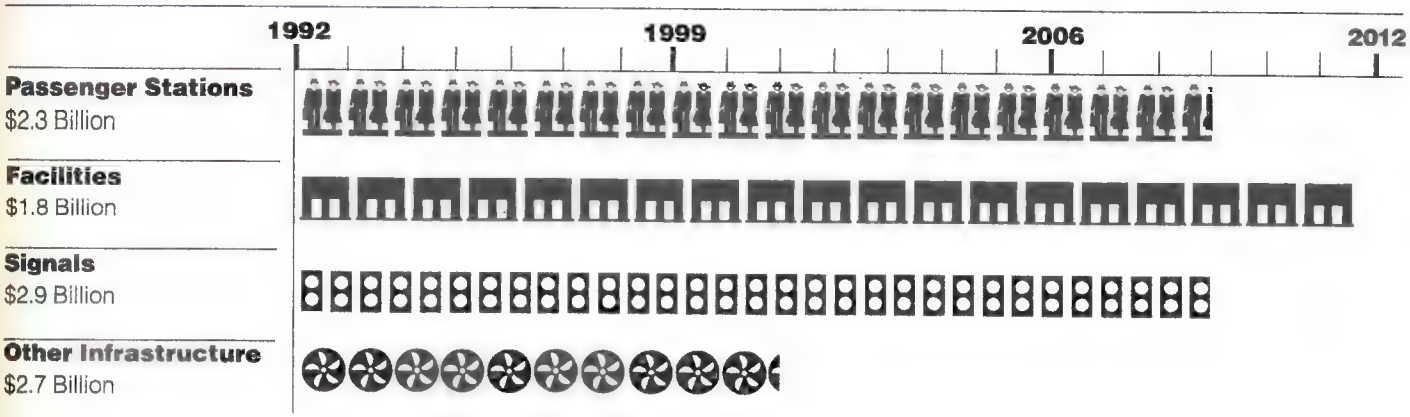
Stations

Despite some improvements, the current condition of most of the 469 stations is a barrier to increased transit use; many have not had any significant

restorative work since their original construction. Using as a yardstick the pace of rehabilitation in recent years, stations would not reach a state of good repair until the middle of the next century.

Consequently, stations have become a top TA investment priority. By the end of the 20-year period, customers should find all stations in acceptable condition. Renovations will include repair of original surfaces, better lighting

Time and Money Needed to Achieve State of Good Repair
(Normal Replacement Costs Not Included)



and signs, more secure revenue-control areas, and better passenger flow. Extensive work will bring power and utilities to a level that can support technological innovations, such as automated fare collection, as well as providing basic needs such as lighting and communications. At five large flagship locations, which serve approximately 9.3 percent of the subway's daily riders, the TA will spend between $20 million and $80 million per station to completely modernize. Included are Times Square, Atlantic Avenue, Brooklyn, and Main Street, Flushing. In all, the TA needs $2.8 billion for station improvements over the next 20 years.

Facilities

To maintain its subway cars and buses, the TA operates two enormous car-overhaul shops, 13 car-maintenance barns, 22 storage yards, and 19 bus depots. Although upgrades have been made and some new construction has been done in the past few years, many of the facilities still date back to the turn of the century and are ill-equipped to care for an increasing volume of modern rolling stock. Benefits to customers cannot be sustained without additional modern maintenance facilities. In addition, inadequate storage capacity leaves many subway cars and buses easy targets for vandalism.

The 1982-91 phase of the capital program began the enormous task of rehabilitating and expanding these critical maintenance and storage facilities. From 1992 to 2011, more than $2.9 billion is needed to continue rebuilding and replacing shops, yards, and depots and to replace maintenance equipment and building components at regular intervals.

Infrastructure

The subway's infrastructure includes the steel skeleton that supports the tunnels, els, and stations; fans that remove smoke in emergencies; pumps to keep tunnels dry; the electrical distribution system that supplies air-conditioned trains with power; tunnel lighting for the safety of customers and employees; the signal system that regulates train movements; and various communications systems, including telephone, radio, and data communications. Although not readily apparent to passengers, these components are no less critical to efficient, safe, and reliable operation than are rail cars and track.

- Infrastructure =
  - Tunnels
  - Fans
  - Pumps
  - Power
  - Lighting
  - Signals
  - Communications
  - Structures
  - Track

Much of the equipment is outdated; the cost of maintaining it is high and replacement parts are often no longer manufactured. Elevated structures are deteriorating because of constant exposure to the elements and air pollution. Years of deferred maintenance have also accelerated the decay of these structures.

Despite capital program commitments of approximately $3 billion as of December 1989, there is still much to be done to bring infrastructure to a state of good repair. This work, essential to safe and efficient operations, can be accomplished over the next 20 years at a cost of $5.6 billion.

Track

The 1992-2011 period will require continued investment to maintain track, switches, and welded rail in good repair and to prevent a recurrence of the decay that caused an epidemic of derailments in the early 1980s. A total of $2 billion is needed for the track system.

System Improvements

The projects summarized above, totaling $22.7 billion over a 20-year period, are critical to the physical integrity of the system. Those noted below are intended to make subway and bus travel more inviting, convenient, and comfortable. Going beyond mere replacement of obsolete elements, they:

- Expand the carrying capacity of the subway
- Increase service reliability for buses and subways
- Accord passengers better service and treatment as valued customers
- Increase the accessibility of the system for everyone

A $2.6 billion investment will for the first time in decades enable the system to attract new markets by eliminating barriers to system use. This is a significant step on the road to reducing dependence on the automobile and to serving the future mobility needs of New York City.

Capacity

Although some experienced straphangers grow used to it, standing pressed against strangers on a platform or in a subway car is one of the most unpleasant trials to which riders are subjected. Understandably, those who can find alternatives to the subway in order to avoid this indignity do so. On many lines, trains are often so packed that passengers have to wait for several to go by before there is room for them to squeeze aboard.

Packed trains are a major deterrent to ridership growth on the subway. Crowding is defined by the TA as less than 3 square feet per passenger. At 3 square feet, standing passengers just barely touch each other. To reduce rush-hour crowding the TA proposes to expand track capacity in several key locations and to purchase an additional 489 cars over the next 20 years. The cars will meet a projected growth in ridership and will provide reasonable comfort levels for existing transit users. While the additional cars will be deployed on nearly all lines, the primary beneficiaries will be the most crowded services, including the Queens Boulevard IND (E,F), the West Side Manhattan and Brooklyn IRT (2,3), and the Manhattan Lexington IRT (4,5,6) lines.

Some Measures To Relieve Overcrowding

Buy 489 more cars.

Connection to Queens Boulevard Line. The TA estimates that some 13,000 customers are subjected to severe overcrowding on the Queens Boulevard line each rush-hour period. Trains cannot be added because the tunnel under the East River between Queens and Manhattan at 53rd Street is unable to handle any more traffic. To mitigate this bottleneck, the TA proposes to build a connection to the recently opened 63rd Street tunnel. Trains could then be routed through two tunnels instead of one, and enough service could be added to the E and F lines to significantly reduce crowding. A number of the new cars purchased would serve this route.

Connect the Queens Blvd. line and the 63rd St. tunnel.

Nostrand Junction. As a remedy for crowding on the Nos. 2 and 3 lines, the TA proposes to eliminate a track bottleneck in Brooklyn. Reconstruction of the Nostrand Junction would permit the addition of several more rush-hour trains, benefiting Brooklyn and Manhattan riders.

Eliminate the track bottleneck where the Nos. 2, 3, 4, and 5 lines converge in Brooklyn.

These projects to reduce "capacity constraints," along with the deployment of additional cars, would go far to ease cheek-by-jowl subway travel. However, one serious problem does not lend itself to these relatively modest solutions: crowding on the IRT Lexington Avenue service. The only remedy for this congestion is to physically expand the system by constructing a second subway line on the East Side of Manhattan, as described in Chapter 5.

Reliability

Subway service is more reliable today than it has been in decades, thanks primarily to investments in and better maintenance of trains and track. Reliability will continue to improve with continued reinvestment in the basic system.

Nevertheless, there are some projects that would boost reliability even further and would help the TA respond more quickly when disruptions occur, thus minimizing the impact on customers.

- Central Command Center. Unlikely as it may seem, the nation's largest subway has no central command center to monitor and direct train movements, in the way that air-traffic controllers guide and track planes. Instead, for the past 60 years, train movements have been controlled from many separate field locations connected only by telephone and radio communication.

- Additional Track Interlockings. Interlockings are complex switches that shift trains from one line to another or between local and express tracks. Building new ones would give TA operations more flexibility by increasing the options for routing service around disruptions caused by disabled trains or uncontrollable events. The recent shutdown of the Eighth Avenue line because of floods and asbestos contamination – and the success the TA had in rerouting some of those trains along Sixth Avenue – demonstrated the value of such track investments.

Connections and Access

The more convenient the transportation system is to use, the more customers will use it. Better connections among subway and bus lines and commuter rail services and easier access for the mobility impaired will make transit more appealing.

While numerous links have been made over the years among the formerly independent IRT, BMT, and IND subways, the peculiar half-connection between the Bleecker Street (IRT) station and the Broadway-Lafayette (IND) station in lower Manhattan remains incomplete. Transfers can be made to and from the IND to the Brooklyn-bound IRT only, making trips convenient in one direction but roundabout and cumbersome in the other. The TA proposes to build the other half of this connection, which will be used by about 10,000 customers daily and will reduce crowding for East Side-bound Brooklyn riders on the Lexington and Eighth Avenue lines. The TA also plans to build two other connections that enable customers to walk between stations, one in Brooklyn and another in lower Manhattan.

Bus ridership on Staten Island has grown with the population of the borough, and bus assignments now exceed the capacity of the two existing depots. More bus service to Manhattan's central business district is needed, as is better integration of bus and SIRTOA schedules. A third Staten Island bus depot is needed to support the additional service.

Capital expenditures have enabled the TA to purchase lift-equipped and kneeling buses; by the end of 1990, 91 percent of the fleet will be specially equipped to serve mobility-impaired people. Future purchases will bring this to 100 percent. Opening transit to additional elderly and disabled riders is an MTA goal and an excellent means of augmenting ridership and expanding service. Eight subway stations are now wheelchair accessible and another eight are in the planning or design stages or under construction to make them accessible. An investment of $100 million over the next 20 years is proposed by the TA to continue the construction of ramps and elevators for greater subway access by mobility-impaired customers.

To promote greater use of public transportation, the TA proposes to integrate the pieces of the MTA network further by investing in facilities that will provide better connections between buses and subways at major commuter rail and park-and-ride transfer points, and to form partnerships with other transit providers and the private sector.

AFC will make using the system easier and will enable the MTA to market transit services to entirely new segments of the population.

Automated Fare Collection

The current method of collecting fares in TA subways and buses is at least 70 years old. In an economy that is shifting from cash to plastic cards, requiring a fistful of coins to board a bus or at least a dollar and two coins to buy a token is an impediment to ridership growth.

Automated fare collection (AFC) offers the convenience, security, and flexibility of fare payment based on the purchase of magnetically encoded plastic cards. It makes possible numerous options and incentives for using public transportation, permits more convenient subway-to-bus transfers, and streamlines fare collection while helping to curb theft and fare evasion (currently costing the TA some $60 million annually). It could also allow customers to travel among different transportation services in the New York region at specially priced fares. AFC has the potential to radically change the public's perception of the subway and bus systems, enabling the MTA to market transit services to entirely new segments of the population.

Over the past two and one-half years the MTA has successfully tested what is possibly the most advanced and flexible AFC technology in the world. The tests were conducted in one of the toughest laboratories imaginable – the subways and buses. When AFC is fully implemented, cards could be sold through any number of outlets. A portion of AFC is funded in the 1987-91 capital program and the total cost over 20 years (including normal replacement) will be at least $672 million. AFC could be fully implemented by the close of this decade.

Customer Information

While upgrading stations is one of the most visible means of improving perceptions of the subway, better communication with customers is certain to make riders feel more favorably disposed to the system. The systemwide fiber-optics network, now being installed, paves the way for the use of electronic signs on platforms and mezzanines to convey up-to-the-minute information about service. Customers on platforms will know when the next train will arrive; those entering the system will learn about delays before paying the fare. The number of public address systems in stations will be increased and new trains will be equipped with exterior speakers so passengers can hear announcements about service before they board.

Metro-North Commuter Railroad

For Metro-North to continue providing high-quality service it must complete the job of restoring its system to a state of good repair and must maintain it on a normal replacement cycle. Moreover, because ridership increases are essential in a region where automobile dependence is high and roadways such as the Cross Westchester Expressway and the Hutchinson River Parkway are already exceeding capacity, further enhancements will be needed to attract and accommodate more customers.

Continuing Capital Needs 1992-2011 (1988 $)

	Metro-North Commuter Railroad
State of Good Repair	**$ 1.0 Billion**
Normal Replacement	**$ 1.5**
System Improvements	**$ 1.4**
Total *	**$ 3.9 Billion**

*Numbers may not add up to total because of rounding.

State of Good Repair
Normal Replacement

During the next 20 years, much of the remaining state of good repair work will involve rehabilitating bridges, viaducts, tunnels, and stations along the railroad's right-of-way. Many of these structures are 80 to 100 years old and could jeopardize safe and reliable service. The cost of this work is estimated at $600 million.

The largest state of good repair project, totaling over $200 million, is the rehabilitation of Grand Central Terminal. This world-renowned landmark, the arrival and departure point for most Metro-North customers, was constructed over 75 years ago. It is a magnificent complex, but most of its key infrastructure elements, such as the elaborate and expensive electrical, plumbing, and heating systems, have exceeded their useful lives and must be replaced.

To enhance Grand Central's appearance and increase its revenue-producing potential, Metro-North proposes also to commit funds for architectural restoration of the terminal's original majesty. A substantial share of money for this important project is expected to come from private developers.

Other state of good repair projects will upgrade the signal, communications, and power systems that are essential to safe and reliable operations. To remedy environmental problems, yards where trains are stored must be purged of contaminated ground water and soil and outlying station buildings platforms, overpasses and underpasses must be restored. The cost of all of this work will exceed $175 million.

Replacing over 480 electric cars, most of which will reach the end of their 30-year lives during the first decade of the next century, is the largest element of Metro-North's normal replacement needs, and will cost about $575 million. The high-level platforms that were constructed in the 1960s and 1970s to accommodate these cars will also have to be replaced. Together with other station work, this will cost more than $80 million.

Over the next 20 years, replacing basic components of the rights-of-way along which trains operate – track, ties, bridges, communications equipment, signals, and power – will require $434 million.

Adequate car maintenance facilities are essential to support service. Replacing Harmon Shop, Metro-North's major repair and inspection facility, will cost over $300 million. By the year 2010, this shop, built at the turn of the 20th century, will be completely inadequate for the 21st, having reached the end of its useful life.

System Improvements

Improvements that will attract new customers and increase capacity to carry them are key elements of Metro-North's strategy for building ridership and easing chronic automobile congestion in the northern counties of New York.

To handle 20,000 additional daily trips by 1995, Metro-North proposes $1.4 billion in system improvements. At least 180 railroad cars will be purchased to accommodate projected ridership. Several track sections will be redesigned and expanded in order to eliminate bottlenecks, increase service, and improve reliability. Projects of this nature will allow the railroad to attract customers and stretch its infrastructure to the fullest to carry them. Without such enhancements, the crowding that Metro-North has virtually eliminated will return and the expected ridership increases could well fail to materialize.

In an effort to overcome the constraints inadequate parking imposes on ridership growth, some 6,500 new spaces will be added at selected stations. This plan to increase access to the railroad builds on a current program in which Metro-North works with local authorities to develop appropriate sites.

Improvements to amenities at other stations include lengthening platforms to allow for longer trains; providing more climate-controlled shelters, heated platforms, and additional canopies for weather protection; and increasing

access to stations by building more overpasses, stairways, and elevators. The estimated cost is over $200 million.

Several proposed projects at stations will improve communications and provide better information to customers. All New York State station platforms will be equipped with telephones that offer schedule, fare, and train-performance information. Customers will be able to call service representatives who will be able to answer questions and solve problems on the spot and supply emergency assistance. A computerized audio-visual information system, now in operation at Croton-Harmon, will be expanded to 15 additional station platforms. It will enable customers to find out if the next train is going to their destination, whether it is an express or a local, and when it will arrive. Making it easier to find stations, simple-to-follow "trailblazing" signs will direct commuters from highways and local streets to the railroad station. The cost of these projects is approximately $7 million.

Long Island Rail Road

The LIRR carries a remarkable 72 percent of the commuter travel market between Long Island and Manhattan. Although its 1989 ridership was about 5.6 percent higher than at the start of the 1980s, projections suggest that there may be limited natural growth in the coming decade. At the same time, the Long Island Expressway and virtually every other artery in Nassau, Suffolk, and Queens counties are choked with traffic not just at rush periods but for more and more hours of the day. Therefore, attracting and carrying additional ridership on the LIRR must be a central strategy for improving mobility and air quality on Long Island.

Although making service more dependable in order to hold its current market is an immediate concern for LIRR management, the groundwork must be laid now for the enhancements needed to increase reliability and change Long Islanders' perceptions of the railroad in the longer term. Unless the LIRR can offer travel alternatives sufficient to persuade workers and pleasure travelers to abandon their automobiles, especially in off-peak periods, Long Island will suffer physically and economically. The LIRR will also require funds to continue restoring plant and equipment to a state of good repair, and substantially more resources will be needed to adhere to regular replacement cycles for this infrastructure.

Continuing Capital Needs 1992-2011 (1988 $)

	Long Island Rail Road
State of Good Repair	$ 0.3 Billion
Normal Replacement	$ 4.2
System Improvements	$ 1.3
Total *	$ 5.7 Billion

*Numbers may not add up to total because of rounding.

State of Good Repair

Normal Replacement

The investments funded through 1991 will bring much of the LIRR to a state of good repair. Bridges, viaducts, and the Flatbush Avenue Terminal remain exceptions. Over $300 million will be required over the next 20 years to put these elements in sound condition.

The LIRR carries 72% of the commuter travel market between Long Island and Manhattan.

But attaining a state of good repair means the LIRR is only catching up after years of deferred maintenance. The railroad also has to replace its extensive rolling stock and physical plant systematically. During the capital program for 1982-91, no funding was required for the replacement of rolling stock. This will change dramatically in the next 15 years as most of the car fleet reaches the end of its useful life. Replacement costs over the next 20 years will exceed $2 billion for the purchase of more than 950 electric cars, coaches, and locomotives.

During 1991 the LIRR will test 10 new bi-level diesel coaches, which carry 50 percent more riders than do current rolling stock. It will also test three dual-mode locomotives. This equipment can run on diesel and electric power, permitting customers from diesel territory to travel into New York City without the inconvenient and time-consuming change at Jamaica. If tests prove satisfactory, this equipment could be ordered for service in the 1992-96 period.

Continuing investments must also be made to regularly replace station platforms, track, bridges, viaducts, power, and signal equipment. Over $900 million will be spent to renew the railroad's 700 miles of track. Altogether, $1.9 billion will be required between 1992 and 2011 for the normal replacement of these vital infrastructure elements.

Over the next 20 years, $200 million will be needed for normal replacement of components in the shops and yards, where rolling stock is stored and maintained. The largest single expense in this category – $80 million – will be needed to replace or thoroughly upgrade the LIRR locomotive shop. The balance will be used to replace shop equipment and car wash facilities and rehabilitate yard facilities.

System Improvements

Pushing trains as rapidly as possible through the funnel-like configuration that extends from Jamaica to Penn Station, the LIRR brings trains into the platforms at Penn Station as frequently as every two minutes during the morning rush hour. Track, tunnel, and platform space is at capacity, and many trains entering and leaving Penn Station during peak periods have standees because there is no room to add trains. Congestion at the portions of Penn Station available to the LIRR also adversely affects performance, especially when a train breaks down. Conditions such as these alienate riders and potential customers alike.

One way to alleviate the problems caused by the capacity constraints at Penn Station is to replace existing rolling stock with bi-level electric cars. These cars would enable the railroad to carry 33 percent more passengers per train, which could alleviate crowding and possibly create enough track and

platform space to allow the operation of additional cars into Penn Station to accommodate ridership growth. Other potential ways of alleviating congestion at Penn Station include new or better connections to the subway in Queens and additional service to the LIRR's Flatbush Avenue Terminal. If these options are effective, further ridership growth would be handled by the purchase of single-level electric cars.

To Increase Reliability and Improve Efficiency

While some improvements have been made at Penn Station since 1982, including the addition of a new West End Concourse and an expanded Seventh Avenue subway mezzanine, the bulk of the station needs a thorough overhaul. Construction is scheduled to begin in mid-1991 for a complete modernization, including a new entrance, new walls, floors, and ceilings, expanded staircases, escalators, elevators, and air conditioning.

Improve signal system.

Over the next 20 years the LIRR proposes projects totaling at least $760 million to increase the reliability and boost the efficiency of its operations. The LIRR's constricted physical layout makes it difficult to recover from service disruptions quickly. Equipment breakdowns and uncontrollable events, such as sick passengers, often create "ripple" effects throughout the system, backing up trains and disrupting service for inordinate periods of time. To provide adequate service to and from Long Island in the future, the quality of operations outside Penn Station must be stepped up, too. Projects proposed over the next 20 years include extensive signal improvements, additional track, and electrification of the Central branch for greater flexibility of train movements among branches.

Add track, crossovers, and interlockings.

Centralize train operations at Jamaica Station.

As in the case of the Transit Authority, centralization of train operations in a single control unit would permit the monitoring and central direction of all LIRR service. Riders would benefit because train movements could be coordinated and officials could respond quickly enough to disruptions to minimize their effects. Central control will cost approximately $150 million and will provide labor-cost savings.

Further enhancements include additional high-level platforms with specially designed shelters to protect passengers from weather conditions. These platforms allow customers to board and leave more easily and decrease the time trains must wait at stations as riders climb up and down steps; the platforms also make trains accessible to the mobility impaired. An additional 55 ticket-vending machines will be installed at stations, reducing lines at ticket windows and making the payment of fares more convenient for customers. These improvements will cost over $170 million.

Triborough Bridge and Tunnel Authority

Ranging in age from 20 to 54 years, the TBTA's bridges and tunnels were originally constructed at a cost of $705.1 million. They are well maintained, but as they grow older, more and more major capital repair and rehabilitation work will be needed to keep them structurally sound.

Triborough has engaged a consultant to conduct an assessment of all its bridges and tunnels. The final report will be completed in the fall of 1990, but preliminary findings show that, as many original bridge and tunnel components reach the ends of their useful lives over the 20-year period, the TBTA will have to reinvest at least $2 billion in its physical plant and structures. Normal replacement projects will absorb at least $1.4 billion of this amount. An estimated $600 million investment in enhancements will also be needed, including Automatic Vehicle Identification, which would eliminate time-consuming toll collections, and expanded service buildings for TBTA design, engineering, and construction management staff.

Continuing Capital Needs 1992-2011 (1988 $)

	Triborough Bridge and Tunnel Authority
State of Good Repair	$ 0 Billion
Normal Replacement	$ 1.4
System Improvements	$ 0.6
Total *	$ 2.0 Billion

*Numbers may not add up to total because of rounding.

State of Good Repair

Normal Replacement

The bulk of the TBTA's capital program is dedicated to the structural needs of the bridges and tunnels. Among the components slated for major repair, rehabilitation, or replacement in the next 5 to 20 years are suspension systems, anchorages, trusses, girders, stringers, and floor beams; electrical, mechanical, and ventilation systems; towers, piers, tunnel roadway decks, liners, tiles, and traffic control systems; and viaduct approaches and exit roads. Triborough estimates that approximately two-thirds of its capital funds will be allocated to structural work over the next 20 years.

A portion of the capital program also will be allocated to preserving and upgrading toll facilities, the toll collection system, and service buildings and administrative space housing most of the TBTA's personnel and equipment.

System Improvements

Several initiatives will be undertaken in the 1990s to enable customers to pay tolls more quickly and to reduce queuing time and congestion on the toll plazas. The capacities of all plazas will be analyzed and master plans will be prepared for each facility. This is expected to lead to the construction of new lanes where feasible, and to changes in signs and in the locations of some automatic coin machines and staffed booths.

Automatic Vehicle Identification (AVI) is an electronic billing and debiting system in use at several locations in the United States, Europe, and Asia. Now being tested by Triborough, it will enable customers to prepay tolls and have their accounts debited as they drive through a TBTA plaza. It will eliminate the need for customers to carry cash for tolls and possibly even to stop. This system will be implemented in conjunction with the master plans, as the TBTA acts to enhance regional mobility and air quality by speeding the flow of traffic.

Vision of a More Mobile Future: Network Expansion and Regional Needs

5

Public transportation is being looked to increasingly as a source of the region's economic and physical survival.

In the early years of the 1980s, discussions of public transportation's future in the New York region centered on whether the subways, buses, and commuter railroads could survive, and for how long. After only eight years of MTA Capital Program investments, public transportation is being looked to increasingly as a source of the region's economic and physical survival.

The MTA is doing what it set out to do: establish plans, raise money, begin to rebuild rolling stock and infrastructure, and win back lost ridership. For the first time in decades, public transportation is in a position to begin fulfilling its mandate to keep this region competitive and livable by increasing mobility and improving air quality.

Even when every component has been completely revamped or rebuilt, the existing network will consist of systems completed by the 1930s to meet the needs of even earlier times. These systems cannot be expected to solve the mobility dilemmas of the 21st century. Over the next two decades, the MTA proposes to intensify the role of public transportation in meeting regional mobility needs by expanding within its established markets and reaching out to serve new markets. Necessarily, much of this expansion will be the result of partnerships that will seek joint solutions to problems such as congestion in the suburbs. Partnerships with other transportation providers, government entities, developers, and employers are essential because the MTA cannot by itself meet the physical and financial challenge of providing the antidote to the automobile. The total cost of such investments over the next 20 years is estimated to be $13 billion to $16 billion. This sum must be weighed against the price of allowing automobile congestion to grow unabated.

Network Expansion

Projects that strengthen market share and capture new markets.

Network Expansion Needs 1992-2011 (1988 $)

Total
$13.0 - 16.0 Billion

Increasing access by public transportation to the economic core of the region is a high MTA priority. The 9.9-square-mile central business district of Manhattan contains the greatest concentration of business activity and jobs in the nation and employs about 25 percent of the work force in the metropolitan area. Although new development is spreading to "satellite" business districts, Manhattan remains the economic engine and employment bellwether of the region. Expansion projects will enable MTA services to strengthen their hold on peak-period market share and attract even greater ridership during off-peak hours when the capacity to carry more riders is available.

At the same time, growing travel demand to and within the city's outer boroughs and suburbs challenges transportation providers, elected officials, and employers to better serve these new markets. The outer boroughs, where 34 percent of workers rely on private automobiles, present a challenge for expanding the reach of mass transit. In some older suburbs, increased population and employment densities make transit more practical than it was 20 years ago, especially as growing numbers of workers who live in the city have become "reverse commuters" and are traveling to jobs in the suburbs.

The following discussion of network expansion opportunities is divided into two major sections: travel to the central business district and suburban and reverse-commute travel.

Travel to the Central Business District

Total daily work trips, by all modes, into the central business district of Manhattan are projected to increase by 13.7 percent, or 252,100 more trips, by the year 2015. Of the total increase, approximately 78 percent, or 196,100

trips, are expected to originate in the five boroughs. This includes 64,000 new work trips across the already congested East River crossings from Brooklyn, 36,350 additional trips from Queens, and 59,450 from upper Manhattan and the Bronx.

Work trips to the Manhattan CBD from the seven upstate New York and Connecticut counties in the Metro-North service area is projected to increase by 10 percent, or 11,200 more trips per day by 2015. Trans-Hudson work trips are expected to increase 16.1 percent, or 31,800. Trips into the Manhattan CBD from Nassau and Suffolk counties will increase 8 percent, reaching close to 10,200 additional trips per day.

Work Trip Demand Changes by 2015

Fewer than 10,000 Trips

10,000–19,999

20,000–39,000

40,000–99,999

More than 100,000

New York City Travel to Central Business District

Reverse Commute from New York City

Metro-North Commuter Railroad Service Area

Long Island Rail Road Service Area

Overcrowded Subway Lines, 2005

Lines Projected to Be Over Capacity in 2005

4 5	Lexington Ave Express from the Bronx	**57%**
2 3	Broadway-Seventh Ave Express from the Bronx	**40%**
E F	Queens Boulevard Line	**31%**
6	Lexington Ave Local	**21%**
4 5	Lexington Ave Express from Brooklyn	**20%**
A C	Fulton Street Line from Brooklyn	**16%**
7	Flushing Line	**12%**

Manhattan's East Side

The East Side is the region's most congested transportation corridor. Its only subway line, under Lexington Avenue, is chronically packed, and building a second East Side subway line to alleviate the crowding is not a new idea. Short segments along Second Avenue were partially constructed in the1970s but abandoned in the city's mid-decade fiscal crisis. Plans have long called for a connection north of 63rd Street between the existing subway system on Sixth Avenue and Broadway and a new line for the East Side, East Harlem, and the Bronx, providing greater access to midtown and lower Manhattan. A second East Side service would alleviate the severe crowding on the Lexington Avenue line. The new East Side line could require approximately 175 additional cars.

Queens-Manhattan Corridor

Additional Queens Boulevard service could be provided by investing in a new signal system that would permit the TA to run trains in the "reverse direction" on some tracks during rush hours, just as multi-lane highways reverse lanes to handle the heaviest traffic flow. This would enable 15 more trains per hour to run on the Queens Boulevard lines. Over 200 additional subway cars and a new storage yard would be needed to take advantage of the additional capacity from such a system.

Connecting the new three-station extension between 57th Street-Sixth Avenue and Long Island City, Queens, to the Queens Boulevard lines is an essential step in making the investment in the 63rd Street tunnel pay off. Whether the proposed connection (discussed in Chapter4) will completely address current

and future levels of market demand in the Queens Boulevard corridor remains to be determined.

LIRR East Side Access

Most LIRR service ties in with Penn Station on Manhattan's West Side. Many customers, however, are bound for the East Side of Manhattan and other non-West Side locations. New LIRR service to Grand Central Terminal via the 63rd Street tunnel would shorten travel times and attract new customers for whom an East Side destination is more convenient.

An alternative to direct East Side LIRR service could be a new subway transfer point instead of Hunterspoint Avenue. The new transfer point might be in the area of Long Island City, Queens. Either the direct East Side service or the alternative transfer location would provide much-needed relief for an over-crowded Penn Station. Upgrading Hunterspoint Avenue could be another way to handle additional LIRR transfer traffic.

Only one of these alternatives–direct East Side service to Manhattan, a new transfer station, or upgrading Hunterspoint–would necessarily need to be pursued.

Network Expansion Projects to Better Serve New Markets

Linking New York's Major Airports with the Transit Network

JFK/LaGuardia Airport Access

Whether New York continues to be a leader of world commerce and finance hinges in part on the quality of the region's airports and on their accessibility. At the moment, New York is virtually the only major city in the world without direct public rail access to its airports. JFK and LGA currently carry about twice as many passengers as they were designed to accommodate, and the volume is expected to grow substantially over the next decade. The Port Authority is expanding the capacity of both, but unless direct rail access is forged to them, New York could find itself with two superb but barely accessible airports. Development of fixed-guideway, high-occupancy service could take place along a number of routes to the two airports, connecting with existing services, and could consist of light rail or people-movers.

West Side Access from the Metro-North Counties

All Metro-North commuters currently are brought to Manhattan's East Side, via Grand Central Terminal. Different approaches could provide Metro-North access to Penn Station for the first time. One route could extend from the Hudson line down the West Side of Manhattan into Penn Station. Another route could connect the New Haven line to Penn Station via the Hell Gate Bridge. New Metro-North station stops on the West Side and in the northeast Bronx would then be possible. Access to Penn Station would provide a direct ride to Manhattan's West Side and a direct transfer for Metro-North passengers bound for Long Island and New Jersey or points on Amtrak's rail service. Penn Station's limited capacity, now inadequate for LIRR use as currently configured and operated, may be an impediment to a Metro-North connection. Improving service for all users will have to be studied carefully.

Trans-Hudson Corridors

During the past decade the number of journeys to work across the Hudson River grew faster than any other Manhattan-bound travel in the region. Vehicular traffic on the West Shore of the Hudson, in northern New Jersey and in New York's Orange and Rockland counties, has become a nightmare as commuting drivers swarm toward the overburdened approaches to the central business district. Rail commutation is crowded and circuitous, often requiring a change of trains.

Between 1988 and 2005, travel demand from Orange and Rockland counties to the central business district is predicted to grow by 19 percent, or 3,815 work trips. The west-of-Hudson commutation area is already one of the most heavily auto-dependent in the region. Without improved rail service it will remain mired in highway congestion. Further south, all trans-Hudson crossings except PATH's uptown service to 33rd Street are at or near capacity for the morning and evening rush periods. Expected rapid growth in commutation to the New Jersey waterfront and in reverse commutation from New York City to New Jersey, coupled with slowly growing demand for traditional trans-Hudson travel, will place further strains on the road and rail network.

Working with NJ Transit and the Port Authority, the MTA is exploring a series of options, including extending the subway between midtown Manhattan and New Jersey, the reinstitution of West Shore passenger rail service in New Jersey, the creation of a rail transfer hub at Secaucus, and an additional Hudson River rail crossing, possibly in the vicinity of the Tappan Zee Bridge. These options are discussed below.

A New Subway Service

The No. 7 subway line could be extended from midtown Manhattan across the Hudson River, possibly terminating at a railroad transfer station in Secaucus.

To Better Serve Growing Markets

Such an extension could free up much existing tunnel and bridge capacity by permitting the Port Authority Bus Terminal to be relocated from Manhattan to New Jersey, with a direct connection to the proposed rail line. Benefits would include faster, more direct service to midtown Manhattan and Queens from New Jersey and Orange and Rockland counties, and more expeditious movement of goods into and out of New York as the result of removing thousands of buses from the Lincoln Tunnel.

West Shore

Passenger service along the West Shore of the Hudson River was discontinued in 1959. Since then, the population of Bergen County in New Jersey and Rockland and Orange counties in New York has increased by 32 percent,

heavily burdening the Tappan Zee and George Washington bridges and necessitating a reexamination of this abandoned transportation option.

A revitalized West Shore line could run nearly 60 miles from Hoboken, New Jersey, in the south to Newburgh, New York, in the north, providing rail commutation service to an area that is unserved. A joint venture with NJ Transit, the West Shore line could have eight stations in New York and give passengers access to midtown Manhattan and NJ Transit service via the Secaucus Transfer.

- Secaucus Transfer

  A new transfer station in Secaucus, New Jersey, under study by both Metro-North and NJ Transit, would allow customers to transfer from NJ Transit's Pascack Valley, Main, and Bergen lines for direct northeast corridor service into Penn Station. This connection would reduce travel times for the growing number of west-of-Hudson commuters who must now make a less convenient transfer to PATH or ferries in Hoboken. In addition, the existence of the transfer station would broaden the market for NJ Transit services.

- Upper Hudson Crossing

  The feasibility of a new rail line crossing the Hudson River in the vicinity of the Tappan Zee Bridge is under study. The crossing could be either a bridge or tunnel and would constitute a major expansion of rail travel opportunities in this crowded suburban corridor. It would reduce vehicular congestion on the Tappan Zee Bridge, substantially increase Metro-North's ridership, and provide direct access to Westchester County and Manhattan for residents of Rockland and Orange counties. The line would also be a key part of any service extension to Stewart Airport.

- From Outside the CBD

  Between 1980 and 1988 the number of commuters traveling from outside the region to jobs in the central business district mushroomed 46.8 percent, or approximately 10,700 trips. To the north, Metro-North service at the ends of the Hudson and Harlem lines could be extended beyond Poughkeepsie and Dover Plains and eventually electrified. Extended service would also spur the continuing development of Dutchess County.

Suburban and Reverse-Commute Travel

Roughly 77 percent of the new jobs created in the region during the past decade were in the suburbs, stimulating the growth of suburb-to-suburb commuting. Each work day 3.6 million commuters travel to work in the region

but are not bound for Manhattan's central business district; 87 percent of them go by private car. Economic forecasters expect the suburbs to capture 75 percent of future regional employment growth.

The suburb-to-suburb trip is the major contribution to growing travel demand in the region.

The Northern Counties

Suburban work trips by all travel modes within the Metro-North service area are expected to increase by 28.5 percent, with close to 419,000 more daily trips between 1988 and 2015. Some 16,000 new reverse-commute trips to the northern counties on all transportation modes are projected to emanate from New York City, a 32 percent increase.

The demand for inter-suburban movement, however, is for east-west connections among the New York and Connecticut counties to the north and for trans-Hudson connections. On Interstate 287, the Cross Westchester Expressway, for example, traffic has increased by more than 40 percent in the past decade and a half because of the success of commercial real estate development in the corridor, the highway's primacy as the only east-west component of the interstate system in the county, and the connections it makes among suburban employment centers.

A new rail line running roughly parallel to I-287 in this crowded corridor could provide access to major suburban job areas such as Stamford and White Plains while reducing automobile congestion on the Tappan Zee Bridge and on the expressway. Furthermore, a direct link between Metro-North's west-of-Hudson service and Stewart Airport could support Stewart's development into the region's fourth major airport. That prospect gained momentum in the fall of 1989 when American Airlines announced the start of daily passenger service from Stewart to Chicago and Raleigh-Durham. The new link could stimulate further economic growth in the Hudson Valley region and, in tandem with the proposed crossing, tie the Hudson Valley and New York City closer together.

The Long Island Counties

Intra-island work trips by all travel modes within the LIRR service area are expected to increase by 21.3 percent, with close to 240,000 new daily trips, between 1988 and 2015. The reverse commute from New York City to Long Island will also be significant, increasing by 22.6 percent, or 19,800 new daily work trips, by 2015.

The LIRR's traditional market in this century has been employment in the central business district, and that is how it has geared its services. New transportation modes to accommodate west-to-east and north-south, south-north trips to work are needed. At present, Long Island's choked roadways are contributing to a labor shortage, as people increasingly are unable to get to jobs. To meet growing reverse-commute and local travel demand, the LIRR could build more track capacity, expanding to three tracks on some branches. With additional

capacity, the railroad could provide more intra-island service without compromising its traditional peak-hour market. Additional track segments would also give the railroad more ways to route trains around breakdowns, accidents, and other problems, avoiding massive service disruptions.

Adding track capacity will take time, however, and the transportation need represented by the growing reverse-commute and intra-island markets requires a more immediate approach. In the near term, the MTA and its agencies are attempting to fill this demand by improving bus-rail coordination and increasing local and express bus service on Long Island. An interagency task force, comprising the MTA, LIRR, the Metropolitan Suburban Bus Authority, and Nassau County and Suffolk County officials, is studying possible locations for transportation "hubs" that would help to integrate railroad and bus services on the Island. Additional bus routes and more local bus service are being examined as part of this effort. Such measures could mitigate the need for increased rail service, but the greater capacity afforded by more LIRR track may still be required.

Potential Resources

6

Without dedicated revenue, there is no certainty that investments will be protected and that initiatives needed for regional mobility will be undertaken.

Since its inception in 1982 the MTA Capital Program has operated on five-year, rather than annual, funding cycles. This longer horizon has enabled the MTA to plan and fund long-range capital improvements more effectively, without the uncertainties and revisions entailed in a yearly scramble for money. However, the stability that a five-year program phase provides will be undermined if it is not built on assured and continuing funding sources. Without predictable, dedicated revenue streams for long-term capital work, there is no certainty that the previous investments will be protected and that the new initiatives needed for regional mobility will be undertaken. Much has been accomplished with the funding to date, but there is a long unfinished agenda for continuing the rebuilding work and expanding the system to meet regional needs. Unless a vision is backed with dollars, it is in danger of remaining no more than a dream committed to paper and filed away.

The capital program for the years 1982-86 responded to a transportation emergency. Needing to supplement traditional city, state, and federal support, the MTA relied heavily on fare- and toll-backed bond financing and one-time sources of funds.

This arrangement was repeated in 1987, when federal assistance was reduced and special federal tax provisions that the MTA was able to use in financing equipment purchases were ended, and the capital program was once again in need of secure funding. New bond financing for the 1987-91 phase was supported by dedicated mortgage recording taxes and by anticipated TBTA toll increases. New fare-based bonds were not utilized, but

existing balances will be drawn upon. The city increased its contributions as well. One-time sources of revenue were again essential in closing the funding gap. Among these were the transfer of funds from the Municipal Assistance Corporation, the "trading-in" of Interstate Highway funds earmarked for the Westway project, and the expected sale of valuable real estate.

As the conclusion of the second capital program phase at the end of 1991 draws near, the MTA once more must find sufficient money to continue. New resources will be required to fund both the continuing needs of today's transit systems and major transportation network expansions. Continuing needs can be funded in a fashion similar to the 1982 and 1987 capital plans. Major network expansion projects, however, have not been included in past programs, and the issues associated with support for these projects differ markedly from those associated with continuing needs. Both types of needs– continuing and network expansion – meet important objectives in equipping the region for the mobility challenges ahead. However, because survival of the transportation network always is uppermost, the continuing needs of the current transit system must be paramount.

The following presents a possible funding framework for both continuing capital needs and network expansion initiatives for the 1992-96 period.

Funding the Continuing Needs

The MTA operating agencies have identified a need for an average $1.9 billion a year in 1988 dollars over the next 20 years to meet the continuing capital requirements of the transportation network. Specific projects and program size will be determined in a 1992-96 MTA Capital Program proposal to be developed over the next year. However, a rough estimate of 1992-96 program size can be obtained by distributing the capital needs evenly over the 20-year period. At an equalized annual level, $2.4 billion annually, or a total of $12 billion, would be required to fund continuing needs in the 1992-96 period, including provision for inflation.

To meet this level of continuing needs, funding commitments from federal, state, and city sources will have to equal or be greater than those in 1982 and 1987. Current levels from these sources, including an adjustment for inflation, could provide approximately $4.6 billion for continuing capital needs over the 1992-96 period. Funding levels beyond this could be achieved through the adoption of the American Public Transit Association's "Transit 2000" federal funding proposal (see box on page 60). Adoption of the T2000 proposal could increase funding levels for continuing capital needs by an additional $2.1 billion over the five-year period.

The Transit 2000 Task Force of the American Public Transit Association has proposed a new federal program designed to be responsive to the mobility requirements of the 21st century. Based on estimates of transit and highway needs combined, the recommended program calls for a total federal investment in metropolitan transit and highway networks of not less than $25 billion per year and as much as $34 billion.

The T2000 proposal would raise the existing funding levels for public transportation to an estimated national program of approximately $11 billion a year: $5.7 billion to meet continuing need – replacement, rehabilitation, and upgrading of existing system – and $5.2 billion for major capacity expansion and building an increased market share for public transportation. Funding for this program expansion would come from an increase of seven cents in the federal gasoline tax dedicated to transit, in addition to current levels of federal transit support.

Currently there is a $2.1 billion annual federal mass transit capital allocation, of which the MTA receives approximately $350 million. In the proposed program, $5.7 billion would be dedicated to essential reinvestment in existing transit. Based on its share of the current federal capital program, the MTA could expect to receive almost $900 million annually to fund basic needs.

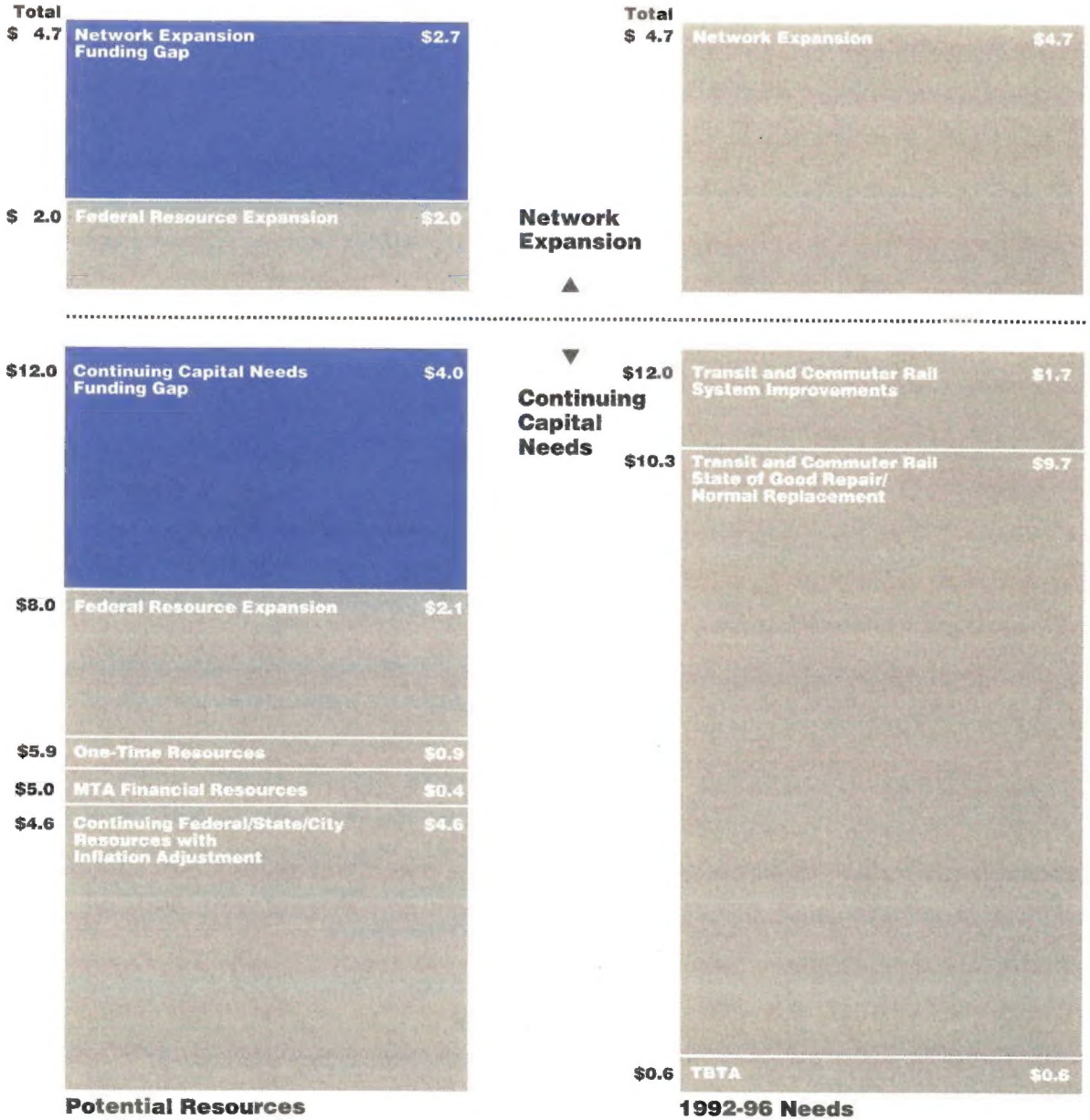
The balance of the federal program would fund major capacity expansion, with the percentages to be granted to transit and highway projects determined by regional consensus. While the allocations have not been determined, the MTA might expect to receive at least $400 million annually for expansion projects.

One-time resources, such as the balance of the MAC commitment, Westway trade-in, and the remaining investment income funds generated by capital market activities, total approximately $900 million and are expected to be available for the 1992-96 capital program. If the continuation of commuter railroad capital depreciation transfers from the operating budget is added to the above sources, the total of all currently identifiable sources comes to approximately $8 billion over the 1992-96 period.

Intentionally absent from the funding picture are future estimates for MTA bonds. Current MTA operating budget projections for the post-1991 period do not indicate any additional debt-service capacity to generate bond proceeds for the 1992-96 capital program. However, if the operating budget were fully funded to increase at approximately the CPI, including allocations to continue debt service at its current share of the annual budget, the MTA could support approximately $1.5 billion in new debt over the 1992-96 period. This would require raising tolls, fares, or MTA-dedicated taxes to carry additional debt service of $141 million a year beyond the $500 million annual cost of debt issued for the first and second plans. If bond financing for the third capital plan were to be included in the same proportion as in the current capital

MTA Capital Program Resource Projections and Needs 1992-1996

Assuming the adoption of T2000's funding proposal, there will still be a significant shortfall in meeting the MTA's 1992-96 projected needs.
($ in Billions)



Potential Resources

1992-96 Needs
(1994 $)

program, approximately $4 billion would have to be raised, requiring annual debt service of $361 million and revenues to meet this cost.

If all the funding sources described above, save for new MTA debt, were attained, including the significant increase in federal aid, an outcome far from certain, the MTA would still fall short by $4 billion of meeting its continuing capital needs in the 1992-96 period. Among the options for increased funding are new dedicated taxes or user fees and increases or changes in the distribution of current taxes supporting the MTA. The determination of these or other options will rest with the Governor and the Legislature.

Funding Network Expansion Initiatives

Undertaking expensive, long-term expansion projects without predictable funding to complete them is unthinkable. Inadequately funded grand conceptions are bad public policy and a risky expenditure of public funds – as this region has learned from bitter experience. In the 1970s New York suffered the economic and political costs that result from initiating major projects and then having to abandon them. The holes dug for the Second Avenue subway serve as a constant reminder of the need for surety before the first shovelful of earth is turned.

The MTA has outlined approximately $13 to $16 billion worth of network expansion initiatives for current and projected regional capacity needs. These projects should be seen as part of an integrated highway and transit planning process. The funds to continue rebuilding and to expand public transportation will have to come from a broad range of partners – from governments and agencies within New York State and from New Jersey and Connecticut; from the Port Authority of New York and New Jersey, New Jersey Transit, and the MTA; from the private sector; and from the federal government.

APTA's T2000 funding proposal suggests a separate source of money for this type of capital work: a unitary federal allocation of funds for major highway and transit capacity expansion projects made available to regions as a shared resource. Under this proposal, the MTA's portion of federal funds for expansion projects could amount to $400 million per year, or $2 billion over a five-year period. These funds would likely have to be matched 50-50 from new regional resources, generating a total of $800 million annually, or $16 billion over the 20-year period.

However, even at a $2 billion level of potential federal capacity-building funds for 1992-96, there would be a $2.7 billion funding gap to be closed before the region's full mobility agenda could be met.

Metropolitan Transportation Authority
347 Madison Avenue
New York, NY 10017-3706
212-878-7000

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